

**DESIGN CRITERIA**

- 1. BUILDING CODES:
  - a. IBC 2012
- 2. DESIGN LOADS:

**EXISTING PUMP STATION BUILDING**

- a. Roof Dead Load = 20psf
- b. \*Roof Live Load = 50 psf
  - Per USACE Documentation
- c. Floor Dead Load = 150 psf
- d. Floor Live Load = 200 psf
- e. Bridge Crane Load = 2 ton
- f. Pump Loads
  - 1) Large Pump
    - a. Weight of Pump and Motor = 15,000 lbs
    - b. Downthrust = 4,000 lbs
  - 2) Maintenance Pump
    - a. Weight of Pump = 800 lbs

**WELL HOUSE BUILDING**

- g. Roof Dead Load = 100psf
- h. \*Roof Live Load = 50 psf
  - Per USACE Documentation
- i. Floor Dead Load = 115 psf
- j. Floor Live Load = 200 psf
- k. Crawl Space Live Load = 100 psf
- l. Bridge Cranes
  - 1) (2) - 2 ton cranes
  - 2) 5 ton crane
- m. Pump Loads
  - 1) Weight of Pump and Motor = 15,000 lbs per pump
  - 2) Downthrust = 10,000 lbs per pump
- n. \*Roof Snow Load
  - i. Ground Snow Load, Pg = 20 psf
  - ii. Thermal Factor, Ct = 1.0
  - iii. Importance Factor, Is = 1.0
  - iv. Flat Roof Snow Load, Ps = 20 psf
  - v. Design Snow Load, Ss = 20 psf

\* Design is based on most critical effect of Roof Live Load or Roof Snow Load.

**o. Wind Loading - Analytical Procedure**

- i. Basic Wind Speed (3 Second Gust) = 90 mph
- ii. Exposure Category C
- iii. Importance Factor, Iw = 1.0
- iv. Directional Factor, Kd = 0.85
- v. Internal Pressure Coefficient, GCPI = ±0.55 (Partially Enclosed)

**p. Seismic Loading - Equivalent Lateral Force Procedure**

- i. Importance Factor, Ie = 1.0
- ii. Site Class D
- iii. Sds = 0.51 (Ss = 60.0%)
- iv. Sd1 = 0.25 (S1 = 18.0%)
- v. Seismic Design Category D

**GENERAL**

1. The structure is designed to be self-supporting and stable after the building is fully completed. It is solely the contractor's responsibility to determine erection procedure and sequence and insure the safety of the construction personnel, public, building and its components parts, and adjacent buildings and properties. This includes the addition of whatever temporary or permanent shoring, bracing, needling, underpinning, or sheet piling, etc. that may be necessary to brace new construction, adjacent buildings, so that the structure is braced for wind, seismic, gravity, construction loads, etc. and that no horizontal or vertical settlement or any damage occurs to the adjacent existing structure. Temporary supports shall be maintained in place until permanent supports and/or shoring and bracing are installed.
2. Plan dimensions and details relative to existing structure have been taken from existing plans and are subjected to nominal construction variations. It shall be the contractor's responsibility to verify such dimensions and details in the field, and make necessary approved adjustments prior to construction or ordering of materials.
3. It is the contractor's responsibility to enforce all applicable safety codes and regulations during all phases of construction.
4. The contractor shall perform all construction for the project in a manner and sequence that are based on accepted industry standards that recognize the interaction of the components that comprise the structure, without causing distress, unanticipated movements or irregular load paths as a result of the construction means and methods employed.
5. Construction loads shall not exceed design live loads. The contractor shall be responsible for all design required to support construction equipment used in constructing this project. Shoring and reshoring is the responsibility of the contractor.
6. Principal openings through the framing are shown on these drawings. The general contractor shall examine the structural and mechanical drawings for the required openings and shall verify size and location of all openings with the mechanical contractor. Providing all openings required by the mechanical, electrical, plumbing, or other trades shall be part of the general contract, whether or not shown in the structural drawings. Any deviation from the openings shown on the structural drawings shall be brought to the engineer's attention for review.
7. All contractors are required to examine the drawings and specifications carefully, visit the site and fully inform themselves as to all existing conditions and limitations, prior to agreeing to perform the work. Failure to visit the site and familiarize themselves with the existing conditions and limitations will in no way relieve the contractor from furnishing any materials or performing any work in accordance with drawings and specifications without additional cost to the owner.
8. Details labeled "Typical Details" on drawings apply to situations occurring on the project that are the same or similar to those specifically details. Such details apply whether or not details are referenced at each location. Nctify engineer of clarification regarding applicability of "Typical Details".
9. Work these drawings with architectural, mechanical, and electrical drawings. Any discrepancies shall be brought to the attention of the engineer.
10. Do not scale drawings.
11. Any discrepancies between structural and architectural drawings shall be brought to the attention of the architect and structural engineer.
12. Should any of the general notes conflict with any details or instructions on plans, or in the specifications, the strictest provision shall govern.
13. The existing Pump Station Building shall remain in continuous operation during construction. Only one pump may be removed from service at a time.
14. During construction the contractor shall be responsible for maintenance of the existing Pump Station Building.
15. Coordinate exact location of all major components with the engineer, before installation.
16. All pipe sleeve openings through concrete slabs shall be formed with standard galvanized steel pipe.
17. Structural plans and details are based upon the dimensions and requirements of specific pumps and other equipment. The contractor shall verify all dimensions with the pumps and equipment provided prior to fabrication and construction. If the pumps and equipment are different than what was assumed during design, the contractor shall adjust the plans, if needed, to meet dimensional and other requirements of pumps and equipment provided. Any changes to the plans shall be approved by the Engineer and IDOT prior to fabrication and construction. The cost to update the plans is at the contractor expense and shall be included in pay items being updated.

18. No electrical conduit shall be placed above the welded wire fabric or top reinforcing of slab.
19. The placement of sleeves, outlet boxes, box-outs, anchors, etc., for the mechanical, electrical and plumbing trades is the responsibility of the trade involved; however, any box-outs not covered by typical details in structural drawings shall be submitted for approval.

**CAST-IN-PLACE CONCRETE**

1. Class SI Concrete shall be used throughout.
2. Concrete material and work shall be in conformance with the requirements of the Illinois Department of Transportation Standard Specifications for Road and Bridge Construction, adopted January 1, 2012.
3. Concrete shall be discharged at the site within 1 ½ hours after water has been added to the cement and aggregates. Addition of water to the mix at the project site will not be permitted. All water must be added at the batch plant. Slump may be adjusted only through the use of additional water reducing admixtures or high range water reducing admixture.
4. Reinforcing bars shall conform to AASHTO A706, Grade 60, No tack welding of reinforcing in the field will be permitted.
5. Welded wire fabric reinforcing shall conform to AASHTO M55, plain, fabricated from as-drawn steel wire into flat sheets.
6. Wire bar supports shall be furnished for all reinforcing within slabs, inclusive of welded wire fabric. Bottom bars in slabs-on-grade may be supported by other suitable supports. Reinforcing shall be properly positioned prior to concrete placement and may not be re-positioned once concrete operations have begun.
7. Reinforcing steel shop drawings shall indicate the sequence in which layers of crossing reinforcing should be placed in order to produce the correct outermost layer as indicated on the drawings.
8. Light-weight concrete mixtures shall meet the requirements of ACI 301.
9. All hooks shown on drawings shall be standard hooks, unless otherwise noted.
10. Where continuous bars are called for, they shall run continuously around corners and be lapped at necessary splices, or hook at discontinuous ends. Lap lengths shall be given in the splice length table.

**11. SPLICE LENGTHS**

Bar Size	Min Lap
#3	1'-3"
#4	1'-11"
#5	2'-5"
#6	2'-11"
#7	3'-10"
#8	5'-1"
#9	6'-5"
#10	8'-1"
#11	10'-0"

\*When lapping two different size bars, use the lap dimension of the larger bar

**PRECAST CONCRETE**

1. Precast concrete construction shall consist of the design, manufacture, transportation and erection of hollow core roof planks.
2. Design of precast members shall be in accordance with ACI 318 - Latest Edition.
3. Precast members may be conventionally reinforced and/or prestressed, consistent with the design loads, spans, handling stresses, etc. Design loads are shown on drawings.
4. Precast contractor shall furnish complete design calculations, including details of connections, bearings, fittings and anticipated cambers.
5. Precast contractor shall furnish and place any temporary shoring, bracing, etc., required for erection of precast work.
6. Precast contractor shall furnish all plates, inserts, angles, rods, etc., required to connect precast to precast or cast-in-place concrete member or structural steel members. Details placing plans shall be furnished for all items to be embedded in cast-in-place concrete.
7. Precast manufacturer shall cast in structural inserts, bolts, plates, angles, dowels, keyways and detailed in the contract drawings.
8. Erection of precast members shall include the furnishing and placing of mild steel reinforcing, wet cast or dry pack concrete at closures of connections outside of precast element.
9. In order to accommodate varying manufacturing and erection procedures, shop practices, etc, deviations from the details and members sizes shown in the contract will be considered. Such deviations will be permitted only after the engineer's approval.
10. Precast hollow core roof planks shall be designed to support the loads shown on the drawings, plus additional concentrations, such as partitions. Refer to architectural and mechanical drawings for openings required through the plank. Precaster shall lay out his planks, considering such openings, and shall furnish any headers or supports as required. Locations of field cut openings shall be coordinated with plank layout. Precaster shall grout all joints between planks.
11. Precast contractor must make provisions for anchorage requirements of all cladding and shall provide necessary hardware required to cast into columns, girders and slabs. Coordinate these requirements with architectural drawing and cladding details.

**ALUMINUM**

1. Aluminum grating shall be extruded I-Bar SG Series with striated top and bottom flanges to provide a skid resistance surface. The grating profile shall be 19-SG-4 with 1 3/8" bar spacing and 4" cross bar spacing. The aluminum shall be 6063-T6 or 6061-T6 alloy per ASTM B221. Attached grating to beams with stainless steel saddle clips. Provide two clips per panel per each beam crossed or angle bearing.
2. All aluminum shall have a clear anodized finish to increase corrosion resistance. Aluminum surfaces are not painted.
3. All aluminum in contact with concrete or dissimilar metals shall be coated with two coats of coal tar epoxy, approved by the engineer, unless otherwise noted.
4. Aluminum angles, channels, tees and I-beams shall be 6061-T6 alloy, extruded and comply with ASTM B308, with Minimum yield strength of 32,000 psi.

**ABBREVIATIONS**

&	AND	HORIZ. (H)	HORIZONTAL
A.B.	ANCHOR BOLT	H.S.B.	HIGH STRENGTH BOLT
ALT.	ALTERNATE	HT.	HEIGHT
ARCH.	ARCHITECT	I.F.	INSIDE FACE
ARCH'L.	ARCHITECTURAL	I.D.	INSIDE DIAMETER
@	AT	JST.	JOIST
B.O.F.	BOTTOM OF FOOTING	KB	KNEE BRACE
BLDG.	BUILDING	L.B.	LAG BOLT
BLK.	BLOCK	L.G.	LONG
BM.	BEAM	L.L.	LIVE LOAD
B.N.	BOUNDARY NAIL	LLH	LONG LEG HORIZONTAL
B.O.	BOTTOM OF	LLV	LONG LEG VERTICAL
BTM.	BOTTOM	LONGIT.	LONGITUDINAL
BRG.	BEARING	L.P.	LOW POINT
BRDG.	BRIDGING	L.W.C.	LIGHT WEIGHT CONCRETE
BT.	BENT	MAS.	MASONRY
C.B.	CARRIAGE BOLT	MAX.	MAXIMUM
C.J.	CONSTRUCTION JOINT	MECH.	MECHANICAL
CL. (€)	CENTERLINE	MIN.	MINIMUM
CLR.	CLEAR	N.I.C.	NOT IN CONTRACT
CMU	CONCRETE MASONRY UNIT	NO. (#)	NUMBER
COL.	COLUMN	N.T.S.	NOT TO SCALE
COLS.	COLUMNS	O.C.	ON CENTER
CONC.	CONCRETE	O.F.	OUTSIDE FACE
CONT.	CONTINUOUS	O.H.	OPPOSITE HAND
COORD.	COORDINATE	OPNG.	OPENING
CSK.	COUNTERSINK	OVHD.	OVERHEAD
CTR.	CENTER	PL (€)	PLATE
d	PENNEY (NAILS)	PLY.	PLYWOOD
DBL.	DOUBLE	P.S.F.	POUNDS PER SQUARE FOOT
D.F.L.	DOUGLAS FIR LARCH	P.S.I.	POUNDS PER SQUARE INCH
DIA (Ø)	DIAMETER	P.T.	PRESSURE TREATED
DIAPH.	DIAPHRAGM	P.T.S	POST TENSION SLAB
D.L.	DEAD LOAD	REINF.	REINFORCING
do.	DITTO	R.O.	ROUGH OPENING
dp.	DEEP	SCH.	SCHEDULE
DWG.	DRAWING	SHT.	SHEET
DWLS.	DOWELS	SIM.	SIMILAR
EA.	EACH	SIMP.	SIMPSON CONNECTOR
EA. END	EACH END	SPC'G.	SPACING
EA. SIDE	EACH SIDE	STA.	STATION
E.B.	EXPANSION BOLT	STAGG.	STAGGERED
ELEV.	ELEVATION	STD.	STANDARD
E.F.	EACH FACE	STIFF.	STIFFENER
E.N.	EDGE NAIL	STR.	STRUCTURAL
E.W.	EACH WAY	THK.	THICK
EX.	EXISTING	THRU.	THROUGH
EXIST.	EXISTING	T. & B.	TOP & BOTTOM
F.B.	FLAT BAR	T.N.	TOE NAIL
FDN.	FOUNDATION	T.O.	TOP OF
FIN.	FINISHED	T.O.B.	TOP OF BEAM
FLR.	FLOOR	T.O.F.	TOP OF FOOTING
F.N.	FIELD NAILING	T.O.G.	TOP OF GIRT
F.O.C.	FACE OF CONCRETE	T.O.M.	TOP OF MASONRY
F.O.M.	FACE OF MASONRY	T.O.S.	TOP OF STEEL
F.O.S.	FACE OF STUDS	T.O.W.	TOP OF WALL
FTG.	FOOTING	TRANSV.	TRANSVERSE
F.V.	FIELD VERIFY	T.SL.	TOP OF SLAB
GA.	GAUGE	TYP.	TYPICAL
GALV.	GALVANIZED	U.O.N.	UNLESS OTHERWISE NOTED
G.C.	GENERAL CONTRACTOR	VERT. (V)	VERTICAL
GLB.	GLUE-LAMINATED BEAM	W/	WITH
HDR.	HEADER	WD.	WOOD
HGR.	HANGER	W.W.F.	WELDED WIRE FABRIC

FILE NAME = G:\111\110223\Work - D:\admin\_3 MO Ave\_Riz\2\ACI00D\_Sheets\01\0876599-arch-KL.A\_Site-01.dgn



USER NAME = bgj	DESIGNED - RJP	REVISED -
PLOT SCALE = 40.0000' / in.	DRAWN - ADL	REVISED -
PLOT DATE = 8/23/2014	CHECKED -	REVISED -
	DATE -	REVISED -

**STATE OF ILLINOIS  
DEPARTMENT OF TRANSPORTATION**

**STRUCTURAL NOTES  
MISSOURI AVENUE DEEP WELL FACILITY**

SCALE: AS NOTED	SHEET 1 OF 2 SHEETS	STA. TO STA.
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F.A.I. RTÉ.	SECTION	COUNTY	TOTAL SHEETS	SHEET NO.
64	82-4T-1	ST. CLAIR	185	75
CONTRACT NO. 76C99				
ILLINOIS FED. AID PROJECT				

**S001**